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Pest Alert

Oak Shothole Leafminer
(*Japanagromyza Viridula*)

The **oak shothole leafminer (OSL)** is a native fly of the Agromyzidae family (figure 1) that occurs throughout Eastern North America. In 2019 and 2020, OSL was found causing defoliation in various oak species throughout large areas of the Mid-Atlantic, New England, and Midwestern States. Both larval and adult stages of this insect cause damage to leaves—the larvae tunnel through leaf tissue producing damage known as blotch mines and adult females puncture newly developing leaves with their ovipositor (egg laying organ) to consume the emerging fluids and to lay eggs. This characteristic puncturing behavior creates holes that grow in size with leaf growth and produces leaves that look to be full of "shotholes." Although this damage does not cause tree mortality, trees are left in a less vigorous state. A tree that experiences repeated years of damage may become more vulnerable to other insects and diseases.

Figure 1.—Oak shothole leafminer (*Japanagromyza viridula*).

Figure 2.—Shotholes and mining blotches on an oak leaf.

Figure 3.—White oak leaves with shotholes caused by oak shothole leafminer.

Hosts

OSL are known to attack black oak, chinquapin oak, chestnut oak, white oak, northern red oak, scrub oak, post oak, turkey oak, bur oak, sand post oak, and Chinese chestnut.

Impact and Identification

The OSL is a small fly that is rather difficult to identify, usually requiring a trained professional to do so. That said, there are things to look for that indicate the presence of OSL. Most Agromyzid flies feed on one plant species or within one genus, and because OSL feeds primarily within the oak genus (*Quercus*), damage found only on oak leaves can suggest OSL are responsible. OSL produce two types of leaf damage: the characteristic ovipositor-created "shotholes" and larval mining blotches. The larval mining blotch pattern can be seen on the top surface of the leaf as paler spots bordering the holes created by the female's ovipositor (figure 2). However, many leaves with shotholes do not have blotch mines (figure 3), because females do not always lay eggs when they puncture a leaf, and the damaged tissue of the blotch mines eventually falls off to increase the size of the adjacent shothole.

Life History

There is still much to learn about the biology of OSL. Adults can be found in the spring and into mid-summer. In the spring of 2020, after a cool April and an early to mid-May oak bud-break period, female egg laying and leaf piercing holes were observed extensively in West Virginia. Others documented OSL females puncturing leaves in late June and July, as oak trees re-foliated following defoliation by spongy moth (*Lymantria dispar*). This latter finding illustrates that adult females can live well into summer or OSL can produce a second generation in summer. After feeding in leaves, the larvae drop to the ground where they are thought to pupate and reemerge as adults the following spring, however, this process is not well studied.

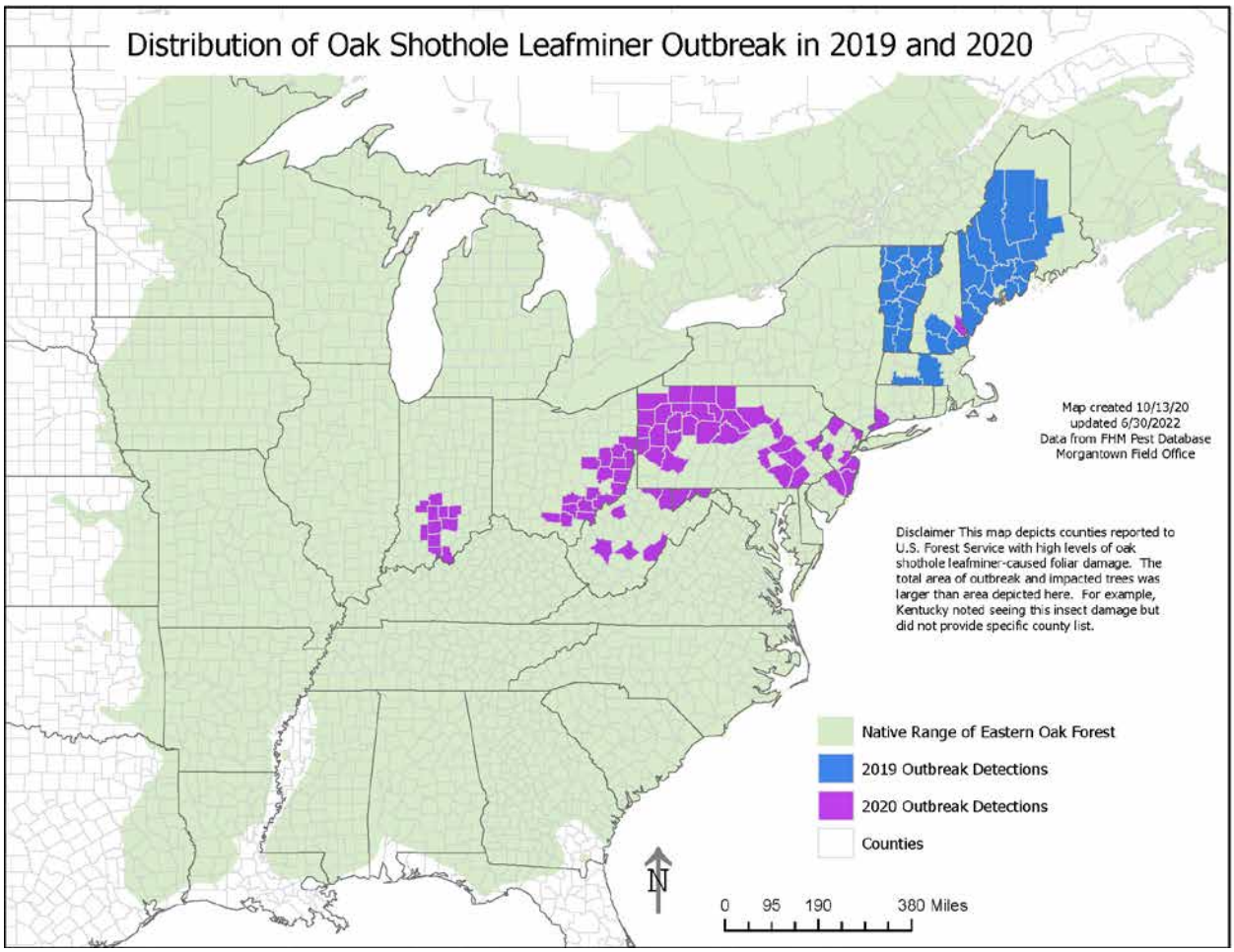

Figure 4.—Areas with oak shothole leafminer outbreaks in 2019 and 2020.

Control

Although OSL can cause a significant amount of damage to foliage, landowners do not typically treat for the pest. If this native insect becomes more problematic in the future, control methods could be identified.

Distribution

OSL is widely distributed throughout the Eastern United States with documented reports from Maine to Georgia and as far west as Kansas, Oklahoma, and Texas (figure 4). It is also found in Ontario, and Nova Scotia, Canada.

References

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